

NATIONAL BORDERS MATTER... BUT LESS AND LESS

Contrary to what trade liberalisation may suggest, national borders still matter. Even for similar size and distance, regions trade less when separated by a border. An assessment of border effects, with respect to a given trade norm derived from a gravity model, makes it possible to measure the degree of integration or fragmentation of a geographic zone, or even measure the discrimination which may exist between different supply sources. How are strong border effects between integrated regions to be explained? Exchange volatility is part of the answer. Consumer preferences and the existence of social or business networks which are especially dense within borders also explain this phenomenon. Nevertheless, long term data indicate that border effects are declining, a trend which new information technologies may accelerate.

With the rise in international transactions in goods and capital and the various processes of trade liberalisation taking place regionally and multilaterally, it became almost incongruous to talk about a role for borders in international relations during the 1990s. The world seemed to be "integrating" rapidly and some commentators had even gone so far as to say that national borders no longer had any economic importance¹. Economists themselves were not far from thinking the same thing: A survey of a panel of specialists revealed that economists did not think that the border separating Canada and the United States had any significant impact on trade flows.

In 1995, J. McCallum published an article which opposed this view, and showed that a Canadian Province, in 1988, traded twenty times more with another Province than with an American state of comparable size and distance². This considerable spread between countries as close and as integrated as the United States and Canada has come across as a puzzle which needs to be understood better and perhaps resolved. Several other studies have since been launched to verify this phenomenon using samples of other countries and other time periods. These studies have also found surprisingly large border effects within the OECD countries or the

European Union. As McCallum has stated: National borders matter. They are far more important than has been thought to be the case, and views of the present state of integration have changed... at least until one gets to explaining or resolving the puzzle of border effects.

■ Borders and "Normal Trade"

How is the impact of a border on trade to be evaluated concretely³? The reasoning is very simple: If borders count, they must have a negative impact on the trade which flows across them. Research then examines to what extent two regions separated by a national border trade less than two regions belonging to the same country. It thus becomes necessary to fix a norm of trade (i.e. to build a model which explains as fully as possible the volume of trade between geographic units) in order to identify the extent to which trade between units belonging to different nations falls below the norm. The gravity model provides such a trade norm.

The gravity model is an empirical relationship linking the volume of trade between two countries to the size of the two countries and the distance separating them (see Box 1).

1. The prediction that the world would soon be freed of constraints linked to the presence of political borders was put forward by certain management gurus like Kenichi Ohmae (a consultant with McKinsey at the time), in his book *The Borderless World*.

2. J. McCallum (1995), "National Borders Matter: Canada-US Regional Trade Patterns", *American Economic Review*, 85(3): 615-623.

3. This letter will limit its analysis of border effects to trade flows. Contributions exist which estimate border effects on the basis of how far the law of one price is violated (C. Engel and J. Rogers (1996), "How Wide is the Border?", *American Economic Review*, 86: 1112-1125) or the correlation studies of regional business cycles in Europe (T. Clark and E. van Wincoop, 2001, "Borders and Business Cycles", *Journal of International Economics*, (55)1: 59-85). These studies have also found very strong border effects.

BOX 1: THE GRAVITY MODEL

The application of the gravity model to trade volumes is certainly one of the most stable and robust empirical relationships in economics. The paternity for this relationship is usually attributed to Jan Tinbergen, in 1962, although numerous studies already used forces of gravity to explain migration flows, telephone communications or airline traffic, for example. Even for trade flows, Isard and Peck (1954) had already preceded Tinbergen from many points of view.

In its most basic form, the gravity model explains the level of imports of country i coming from country j , denoted by M_{ij} , using the following equation:

$$M_{ij} = \frac{Y_i^\alpha Y_j^\beta}{d_{ij}^\gamma}$$
 where Y_i and Y_j represent the GDP of the importing and exporting countries respectively, and d_{ij} the distance between them. Numerous variables may be added to this basic model, but these three variables alone frequently account for three-quarters of the variance in bilateral trade flows, with coefficients very close to 1 for GDP and -1 for distance.

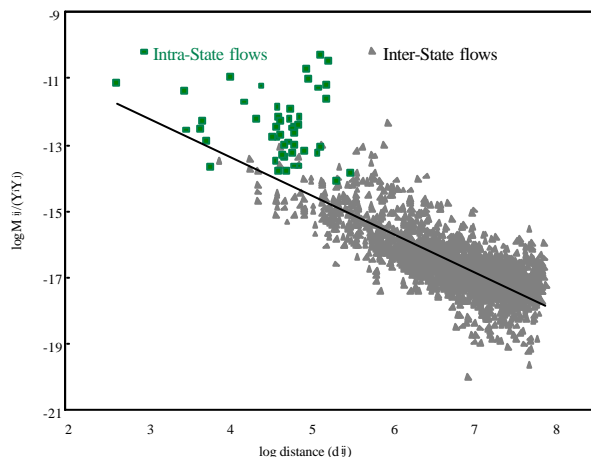
For very many years, the gravity equation was considered to be a result with no theoretical foundations. Furthermore, until the recent introduction of imperfect competition into international trade theory, the main subject of interest at the theoretical level was the nature and composition of trade: In other words, specialisation schemes based on comparative advantage and not on the volume of bilateral trade.

The gravity model is currently undergoing a "renaissance" for three main reasons:

- The international context is made up of moves towards trade and monetary integration, at various geographical levels. Economists thus need a norm for trade to assess questions like the likely impact of EMU on trade flows, for example.
- The theoretical foundations of the gravity equation are now far more clearly established. The model of monopolistic competition with transport costs is the most closely linked to the gravity equation. Other theoretical explanations also support this relationship. Hence, after criticizing its lack of theoretical content, certain economists now claim that the model is based on too many competing theoretical explanations.
- The gravity relationship includes a geographical component. It implies that space is important in economic phenomena, via the distance separating countries. Countries are no longer considered as points situated in a space with no distance, but as geographic entities whose location is important. This approach is common to a number of recent studies that are often brought together under the title of the new economic geography.

This relationship (whose robustness has been confirmed by numerous studies) explains the trade volume between countries, on the basis of easily available data: GDP of the trading partners, and the distance which separates them. It has become a "standard" tool for any economist seeking to study bilateral trade flows between nations.

Graph 1 - Trade flows within the United States, as a function of distance between States



Source: Constructed using the Commodity Flow Survey (1997), Department of Transport, USA.

A particularly simple and striking example of border effects is provided graphically by using a sample of merchandise trade flows between American States⁴. Using the simplest gravity equation (see Box 1), bilateral trade flows between American States (standardised by states' size) can be represented according to the distance which

separates them. Domestic trade flows may be represented in the same way (Graph 1).

Two observations may be made: 1) the gravity model, even in its simplest form, is an excellent tool for predicting volumes in trade; 2) internal flows within States are significantly higher than flows between States of the same size and separated by a similar distance. National borders are therefore not alone in affecting trade: Even borders between American States have a (negative) impact on trade.

Why Estimate Border Effects?

The estimation of various border effects on trade is part of a more general approach known as the "**intra-national macroeconomy**"⁵. At a time of international integration of economies, the study of economic interactions between regions belonging to the same country may provide an idea of the situation to which international economic relations are heading. The border effect of trade, to some extent, measures the distance that still needs to be covered by an economic union before integration reaches the reference level prevailing within a domestic economy (see Box 2).

Border effects are particularly useful when attempting to measure the degree of integration, or fragmentation of a geographic zone. The scale of the border effect and its evolution makes it possible to identify, for example, the degree of fragmentation of the European market. With the gradual reduction of formal barriers to trade, followed by the harmonisation of standards, a real single market means that consumers will be able to turn to foreign suppliers without any additional difficulty. The various

4. This sample is comparable to that used by H.C. Wolf (2000), "Intra-national Home Bias in Trade", *Review of Economics and Statistics*, 82(4): 555-563.

5. See G. Hess and E. van Wincoop (2000), *International Macroeconomics*, Cambridge University Press. This study includes especially a certain number of studies comparing the level of international and intra-national integration of goods and capital markets (by studying two other well-known "puzzles" in particular the domestic bias in stock holdings and the strong correlation between the savings rate and domestic investment).

measures of border effects in Europe tend to show that the market is not yet unified. Even if the degree of fragmentation has clearly fallen over the last twenty years, it has been observed (in 1995) that two European regions tend to trade fourteen times more on average if they are in the same country than otherwise⁶. Furthermore, several sectors, such as sugar, petroleum products, food and agricultural products are characterised by much higher levels of fragmentation.

Other research has also used this methodology for the "natural experiences" of political integration and disintegration. During the 1990s, integration movements (Germany) and disintegration (USSR, Czechoslovakia, Yugoslavia) provide unique examples for identifying the impact of the withdrawal or the raising of national borders to trade. This impact has proved to be very significant. J. and J. Fidrmuc⁷ show that, in 1992 (i.e. just before separation), the Czech Republic and Slovakia traded 32 times more than the prediction of the gravity model, whereas by 1998 this had fallen to 7 times.

Another possible application is the measure of discrimination between different sources of supply. Faced with European integration, a number of third countries, especially the United States and Japan, have manifested their concerns that deepening integration in Europe should not occur to the detriment of third countries, which could see a comparative (or even absolute) deterioration in their access to European markets. This is often called the **Fortress Europe** phenomenon. The border effect takes the national economy, which is assumed to be perfectly integrated, as its point of reference. It provides a good tool for analysing the overall impact of all measures likely to modify the conditions relating to market access of various partner countries. Using this tool, K. Head and T. Mayer⁸ show that imports from third countries indeed experienced comparatively more difficult access to the European market at the start of the 1980s, but also the implantation of the single market has not been accompanied by a Fortress Europe effect, except in certain specific sectors like those linked to the automobile industry.

■ How to Resolve the Puzzle?

The first estimates of the impact of borders on trade flows were so important with respect to what specialists had originally thought, that M. Obstfeld and K. Rogoff included them among the six great puzzles in international macroeconomics⁹. They thus opened a way to a number of studies aimed at explaining the importance of borders.

BOX 2: INTRA-NATIONAL DATA

J. McCallum had the opportunity of working with data for trade between different regions in Canada and the United States. The surplus of trade observed between geographic units belonging to the same country, relative to the norm of trade, then provided him **a contrario** the effect of the national border on trade.

Trade statistics at an intra-national level are unfortunately very rare and the studies which generalised this approach to other countries have had to use a slightly different method, initiated by Shang-Jin Wei*. The idea is as follows: If, for example, it is not possible to observe trade between Greater Paris and other European regions (inside and outside France), it is nevertheless possible to calculate trade within a country. Such trade is simply made up of a country's total production less the sum of its exports to the rest of the world. It thus becomes possible to include such "intra-national flows" in a gravity equation, in order to judge whether they are systematically superior to international flows**.

*S.-J. Wei (1996) "Intra-National Versus International Trade: How Stubborn Are Nations in Global Integration?", *NBER Working Paper*, No 5531.

** Internal distances also have to be calculated as part of this methodology. This delicate and crucial question is treated by K. Head and T. Mayer, (2000), *op.cit.*

The first possible explanation of the negative impact on trade of a border stems from the existence of customs duties and/or non-tariff barriers of all sorts, which may be imposed on goods when crossing the border. Indeed, the border effect implicitly captures all formal barriers to trade which exist between two countries, but which are not directly measurable. At first sight, this explanation for border effects does not appear to be very relevant, in as far as the countries studied are precisely those which are already very integrated. Nevertheless, as Obstfeld and Rogoff have stressed, the level of underlying protection does not have to be high for it to lead to a significant fall in trade: Consumers just have to be very sensitive to price differentials. For the moment, however, studies seeking to explain border effects by measurable barriers to trade (such as non-tariff barriers affecting European trade prior to the Single Market) have not found truly significant effects¹⁰.

In contrast, exchange rate volatility could provide a promising explanation. By definition, nations are monetary unions and A. Rose has recently demonstrated that monetary unions have a positive impact on trade, which could explain part of the trade surplus existing within national frontiers¹¹. Moreover, this type of explanation would be completely consistent with the fact that the impact of national borders in Europe appears to be far more important than that of borders between American States, which have shared the same currency for two centuries.

Another important explanation may stem from consumer preferences. If these are characterised by a home bias, then they could lead to a negative effect of the border. Several

6. K. Head and T. Mayer (2000), "Non-Europe: The Magnitude and Causes of Market Fragmentation in Europe", *Weltwirtschaftliches Archiv*, 136(2) : 285-314.

7. J. Fidrmuc and J. Fidrmuc (2000), "Disintegration and Trade", *CEPR Discussion paper*, n°2641.

8. K. Head and T. Mayer (2001), "Effet frontière, intégration économique et *Forteresse Europe*", *Document de travail du CEPII*, n°2001-6.

9. M. Obstfeld and K. Rogoff (2000), "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?", *NBER Working paper*, n°7777.

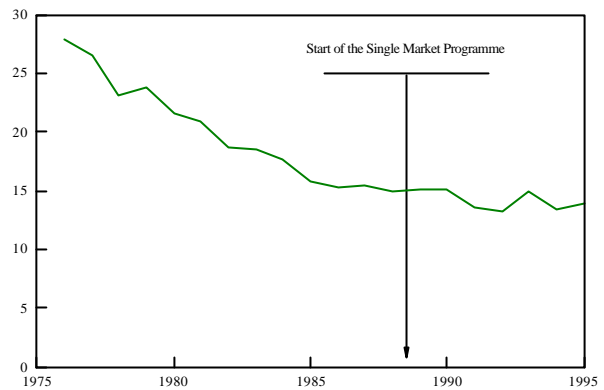
10. K. Head and T. Mayer (2000), *op.cit.*

11. A. Rose (2000), "One Money, One Market: The Effect of Common Currencies on Trade", *Economic Policy* 30: 9-35.

studies have shown that this kind of explanation could be relevant, even if it does not explain the entire phenomenon. Head and Mayer have shown, for example, that products for final consumption display greater border effects than others (this is especially the case for food products and beverages)¹². Another, more indirect, factor concerns the positive impact on trade of bilateral migrations, which surely result from the fact that consumers "transport" (and perhaps spread) their preferences for products of their country of origin, thus leading to more bilateral trade. Recent studies have indeed shown that trade may be significantly facilitated by the existence of dense social and business networks between partner countries¹³. These networks are far easier to set up within national borders, and could therefore be an important factor in explaining the surplus of trade, observed within nations.

One thing is sure, however. Whatever the most relevant explanation may be for border effects or whatever the method of estimation, the general trend shown by all studies based on long term data indicates that these effects are declining. Graph 2 illustrates the trend for trade within the European Union. The impact of borders on both trade between the United States and Canada and within the European Union or the OECD is also less and less important. The development and spread of new Information Technologies could strengthen this trend, by cutting international transaction costs, relative to domestic transaction costs.

Graph 2 - Border Effects in Europe from 1976 to 1995
(Intra-national flows/ International flows)



Source: K. Head and T. Mayer (2000), *op. cit.*.

This leads to the following conclusion. International trade integration led to the view, a priori, that political borders no longer had a significant impact on trade flows. A number of recent studies, however, has refuted this view. But, it is shown also that the economic impact of national borders could rapidly become sufficiently weak for the first impression to be in fact correct.

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12. K. Head and T. Mayer (2000), *op. cit.*.

13. See notably the survey by J.E. Rauch (2001), "Business and Social Networks in International Trade", *Journal of Economic Literature* 39 (4).

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